WATER QUALITY SCIENCE IN THE SACRAMENTO – SAN JOAQUIN DELTA

Chemical Contaminants and Nutrients

A review by the
Delta Independent Science Board
July 2018

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Our review was based on information gathered from:

(1) a literature review of recent publications on the topic of water quality;

(2) responses to a questionnaire distributed to several agencies;

(3) in-person interviews with individuals involved in different aspects of water quality;

(4) comments received on a draft released for public comment.

There were four main findings:

(1) It is not clear whether WQ data are sufficient to support management decisions and policies, nor is it clear how WQ data are being used by managers;

(2) Adaptive management is rarely built into WQ programs;

(3) Water quality too rarely enters into discussions about water supply and reliability;

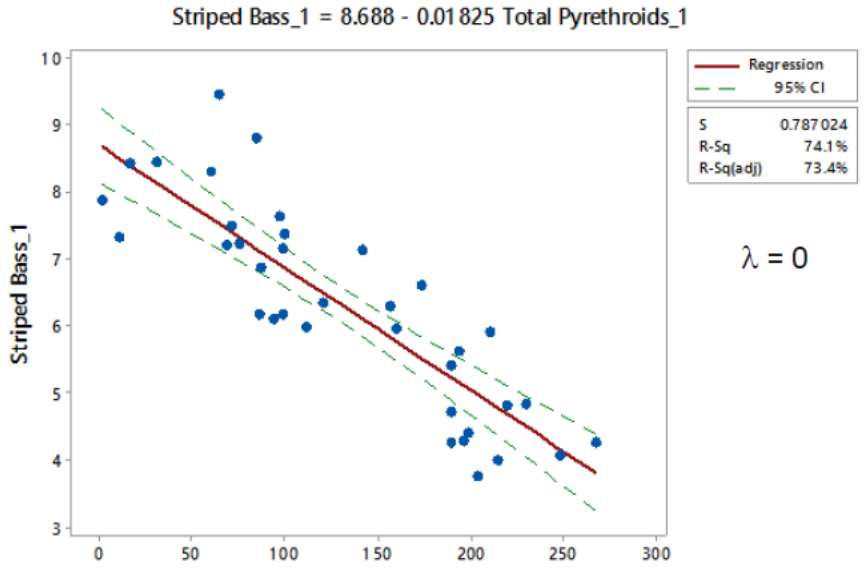
(4) Although several entities in the Delta fund research and monitoring activities aimed at protecting water quality in the Delta, these resources tend to support specific compliance needs.

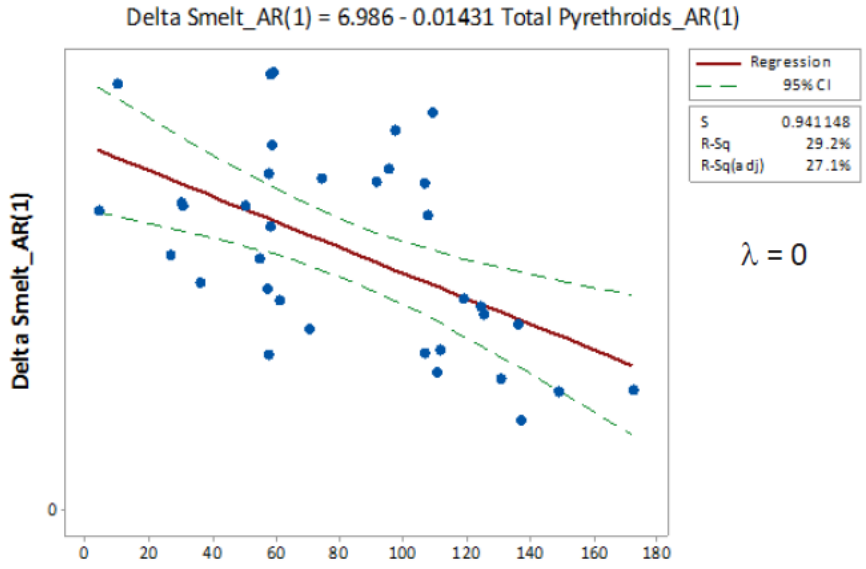
Finding: There is little that is simple, and much that can be misconstrued, in the description and interpretation of WQ in the Delta.

Recommendation: Shared understanding of WQ in the Delta could be improved through development and use of conceptual and numerical models.

Finding: There is still much uncertainty about the effects of nutrients and some contaminants on the Delta ecosystem, especially those of emerging concern.

Recommendation: The management of chemicals of emerging concern (CECs) and harmful algal blooms (HABs) requires greater vigilance and coordination between agencies to protect both ecosystem health and drinking water safety.

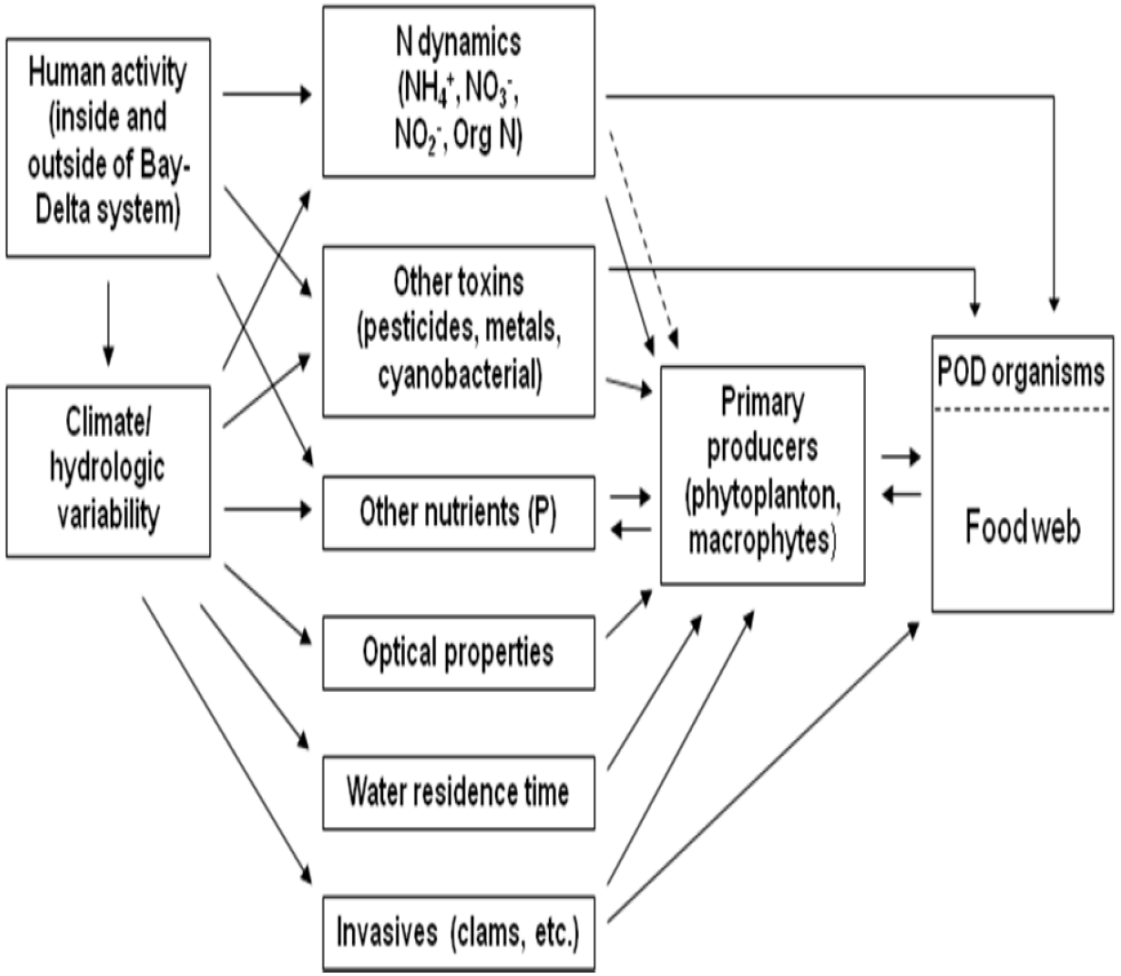




Fong et al., 2016

Finding: There is sufficient science to show that some chemical contaminants, including certain pesticides, mercury, and selenium, are having deleterious effects on the health of organisms in the Delta.

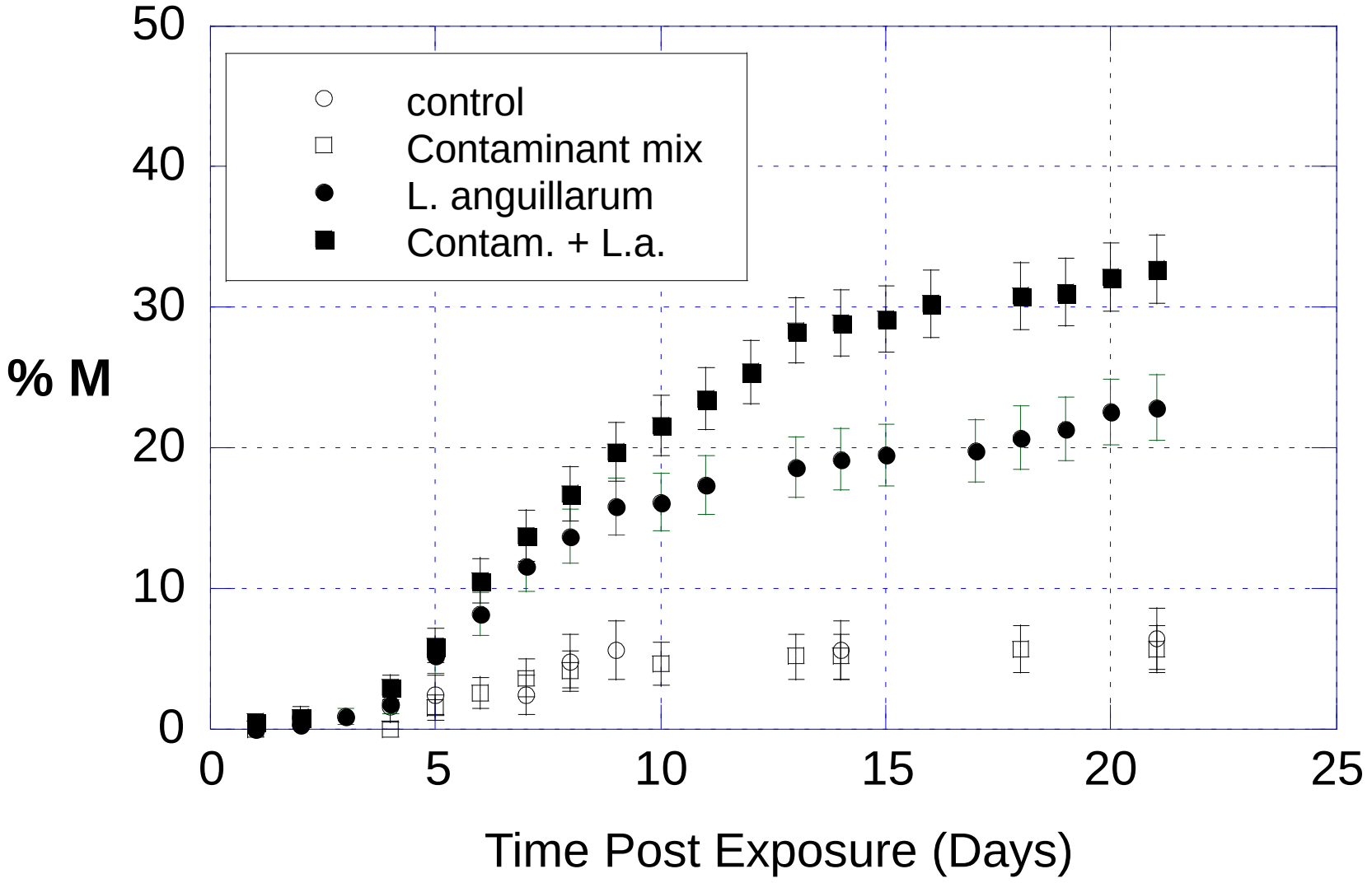
Recommendation: There is a need to further assess the effects of chemical contaminants on the Delta ecosystem through holistic studies that combine toxicity testing and chemical analyses with fish and food-web monitoring.



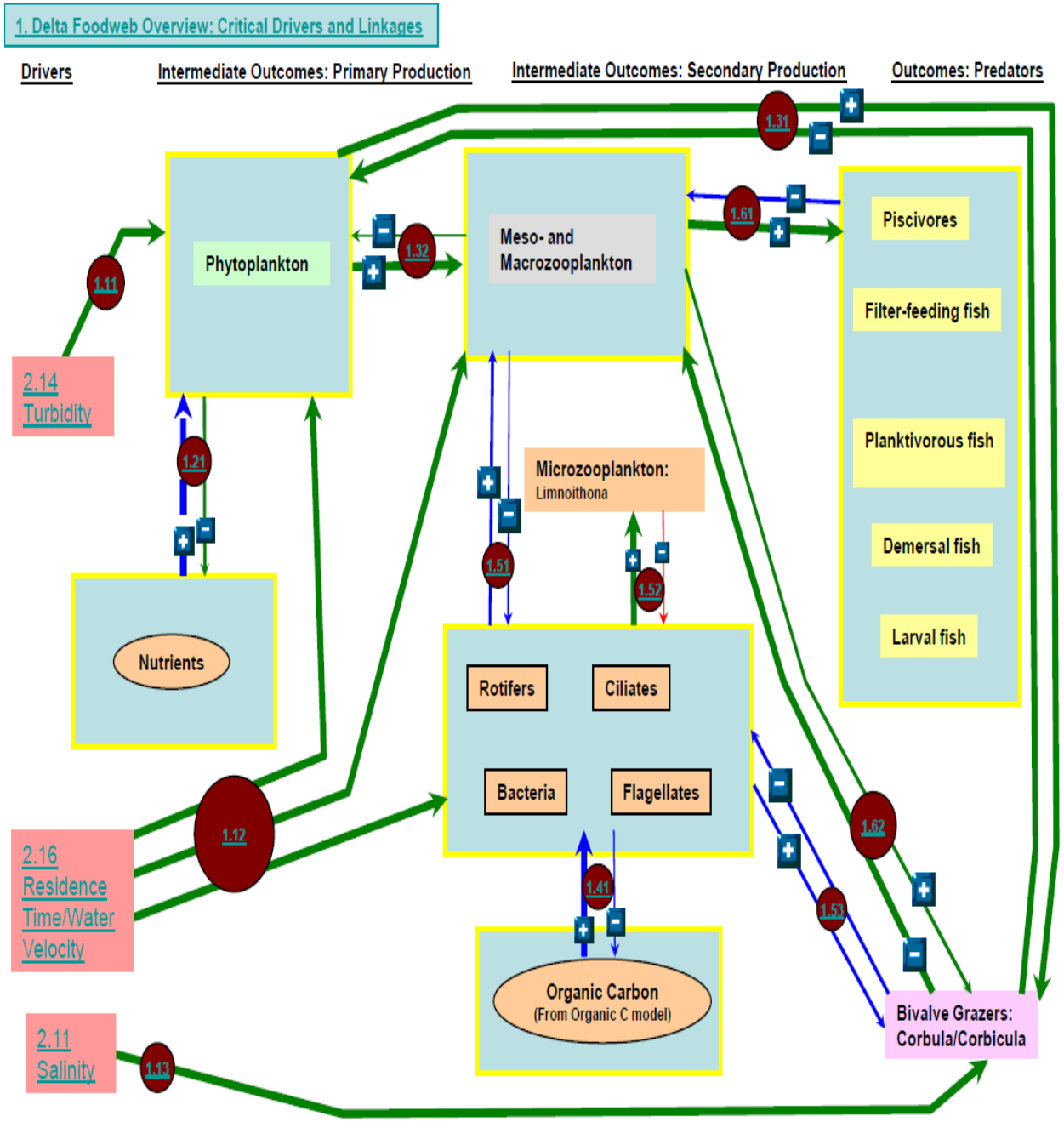
Meyer et al., 2009

Finding: Little attention has been paid to interactions among chemical contaminants, as well as interactions between contaminants and other stressors.

Recommendation: Interactions between chemical contaminants and other stressors require more attention. Improved understanding of the interactive effects of multiple chemicals on the ecosystem is also needed.



Arkoosh and Collier, 2002



DRERIP Aquatic Foodweb, Durand (2009)

Finding: Studies that emphasize broad questions about interactions among nutrients, food webs, and ecosystem processes would more effectively serve management needs, compared to narrower research on nutrient forms and their ratios.

Recommendation: Increased research is needed on the effects of nutrients on the Delta's food web and on the growth of aquatic weeds.

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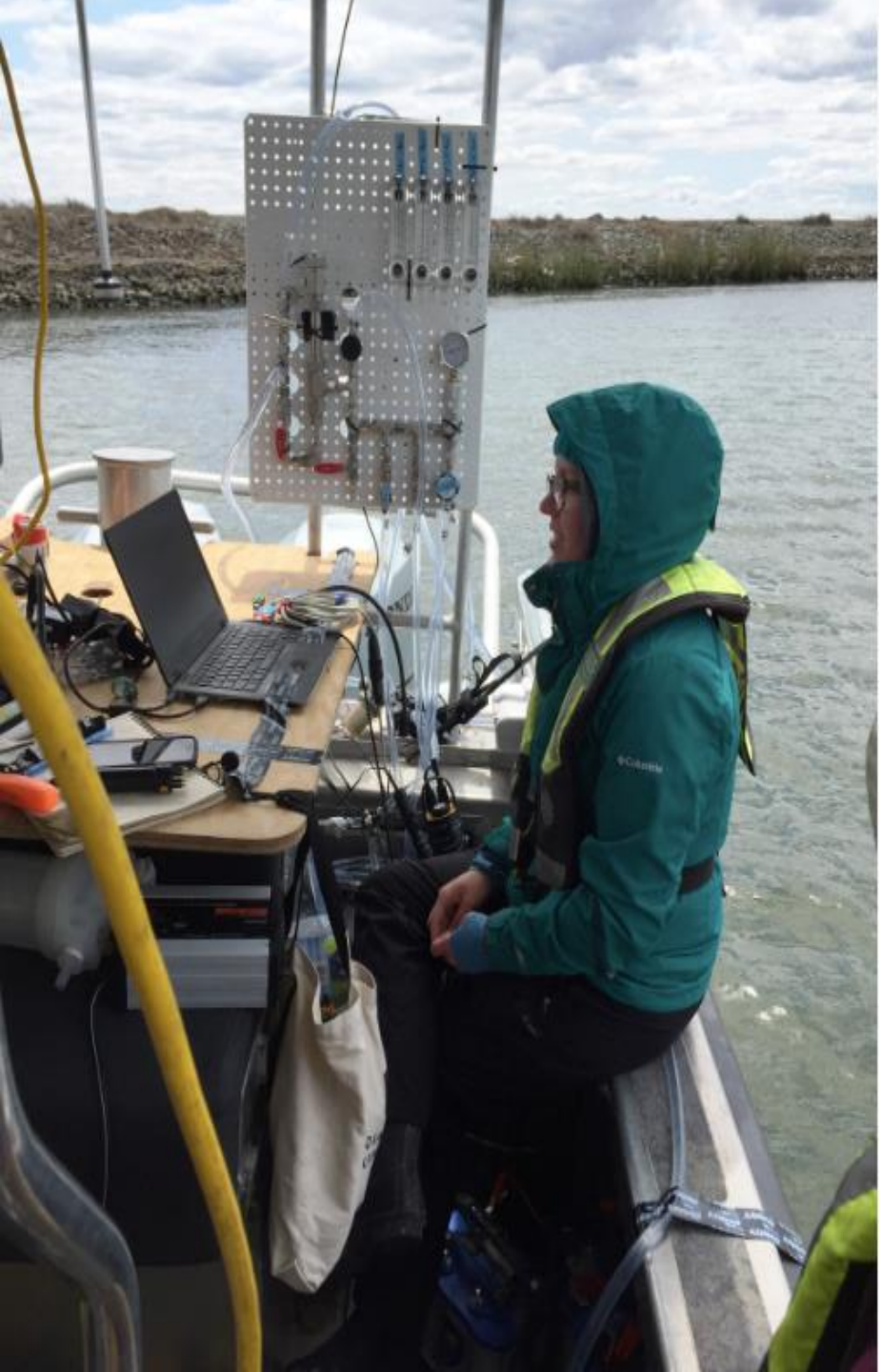

Finding: There is no comprehensive contaminants monitoring and assessment program. The nascent Delta RMP is a positive step, but its coverage is not sufficient to satisfy the need for information.

Recommendation: The Delta RMP needs to expand the contaminants it monitors, and increase the temporal and spatial coverage of its measurements.

CA DFW, Water Branch
CA DWR
CA DWR, Municipal WQ Program
CA Parks and Rec,
Division of Boating and Waterways
CWQMC
CV Regional Water Quality Control Board,
Irrigated Lands Program
Contra Costa Water District
Delta Science Program
NOAA/NMFS
Sacramento-San Joaquin Delta Conservancy
SF Bay Regional Water Quality Control Board
Solano County Water Agency
State and Federal Contractors Water Agency
State Water Resources Control Board,
Division of Drinking Water
State Water Resources Control Board, Office
of Information Management and Analysis
State Water Resources Control Board,
Pesticide Permitting Program
USEPA, Region 9
United States Geological Survey
USGS California Water Science Center

Finding: Collaboration among agencies conducting monitoring in the Delta is neither systemic nor well organized.

Recommendation: Improved collaboration among agencies could lead to better linkages between water quality monitoring done for regulatory compliance and monitoring being done for special studies and in research programs.

Finding: Water quality monitoring is often not done at frequencies commensurate with the variability of the contaminants.

Recommendation: An understanding of spatial and temporal variability in contaminant delivery and the role of key events (e.g., first flush, floods, and tides) will contribute to better understanding and management of contaminants.

CALIFORNIA WATER QUALITY MONITORING COUNCIL

Finding: The California Water Quality Monitoring Council (CWQMC) can be critically important in making monitoring data available.

Recommendation: The CWQMC needs sufficient resources and authority to be more effective. Several agencies can assist in the effort to make monitoring data available.

Finding: Data management efforts do not match the complexity and growing magnitude of water quality monitoring, assessment, and management issues and needs in the Delta.

Recommendation: Data management efforts should be improved, especially regarding quality assurance and quality control.

Concluding thoughts……

Our findings here will influence the Delta ISB's review of the monitoring enterprise in the Delta;

This review clearly points to the need to document and evaluate components of water quality monitoring in the Delta;

This review should help prioritize water quality research;

Attention to source reduction clearly should continue as a research and management priority.

The Sacramento Regional County Sanitation District is undertaking a major upgrade of the Sacramento Regional Wastewater Treatment Plant, which is shown in this recent aerial photograph. The commitment to further reduce nutrient loadings is an excellent example of regional efforts to address water quality concerns in the Delta.

Photo Credit: Sacramento Regional County Sanitation District